Ralph L. Keeney Interview by Detlof Von Winterfeldt, November 4, 2018, Phoenix, AZ

Early Life

DETLOF VON WINTERFELDT: OK. Good afternoon. My name is Detlof von Winterfeldt. I'm a professor of systems engineering and public policy at the University of Southern California, and I'm here to interview Professor Ralph Keeney for the History and Traditions series of INFORMS. We are at the annual INFORMS meeting in Phoenix. It is November 4, 2018, and this is the History and Traditions series.

Ralph, as many of you know, is a prominent decision analyst, and with Howard Raiffa, he is the inventor and developer of Multiattribute Utility Theory, which is one of the cornerstones of decision analysis today. Welcome, Ralph.

RALPH KEENEY: Thank you.

DETLOF VON WINTERFELDT: I hope you're well. If you don't mind, let's move chronologically through your life and highlighting some of the more interesting points, both academically and personally, and let's begin at the beginning. You grew up in Montana in what I think is a very small town called Lewistown. Can you tell us a little bit about that?

RALPH KEENEY: Yes, I did grow up in Lewistown, Montana, a town of 7,000 people. And relatively, it's very large. It's the metropolis for over 100 miles in all directions. And it's a wonderful place to grow up because you are really free to do a lot of things that you couldn't do in larger cities or even very large towns. But also during that time, it was very easy to do interesting things.

The schools were good. There were plenty of activities and it was easy to be involved in all of them, so you could have a lot of friends, develop a little bit of skill with personal relationships, and you had some control over your life-- you could make decisions. And kind of a unique thing about a small town like that at that time-- you can work. I was a pin setter in a bowling alley from third to sixth grade. Never missed a night in the season. And sold papers for years, and also shined shoes-- anything you could do. Got my social security card at eight years old and have the record to indicate what I paid.

DETLOF VON WINTERFELDT: Well, you also collected coins, didn't you?

RALPH KEENEY: Yeah, I am a coin collector. The great thing about being a newspaper boy is you'd get many, many coins. Some of them were interesting and valuable and you could pick them up easily. And in small towns like that where there's a lot of rural people in the area, many of them save some of their coins in a jar and throw them in and they'd be 30 years old. So they were out of circulation for all that time. And then eventually bring them into a bank and there were very good ones there.

The other thing that a few states had, we had silver dollars. And that was the currency. No one used paper money. So I do have a nice silver dollar collection.

DETLOF VON WINTERFELDT: And from Montana you moved into the LA area. Can you tell us how the move occurred and why you moved there and what happened when you arrived?

RALPH KEENEY: Sure. My mother raised me. I had a terrific mother; all defects are mine. And she always wanted to leave and go somewhere else, and I was interested in staying because I enjoyed that town. In my junior year of high school I figured out I probably ought to go to college somewhere, although I had no idea particularly what that was and didn't know people who had gone. And I said to her, OK, I'm willing to go somewhere.

And about that same time she was offered a job in Los Angeles at a newspaper as a bookkeeper by the gentleman who owned the newspaper in my hometown also. So my junior year, she left just after Christmas and moved to Los Angeles. And I actually lived alone for the rest of that year, although the whole town was kind of taking care of you. Finished my junior year, and then I moved after that for my one senior year in high school in the southern part of Los Angeles-- in the LA Harbor-Wilmington area.

DETLOF VON WINTERFELDT: Did you discover even at that time that you were skilled or better at mathematics or other topics in school already? Or was this coming later?

RALPH KEENEY: When you're in a smaller school-- there were 400 in my high school in Montana-- you do know roughly where you stand. And I did know academically I did better than most. But our system was we had eight periods and we went to school till 3:45, so everybody had a study hall. And I never took a book home in Montana ever, because I was working and enjoyed that more. But in study hall, you could do the work that was relevant to other things.

So I did know that I was reasonably decent in most subjects. The school gave a test of what math you would go to your first year in high school, and they had been giving it for years to the eighth graders. And somebody the year I was there said, that's the highest grade we've ever had here.

DETLOF VON WINTERFELDT: Oh, that's wonderful.

RALPH KEENEY: That was an indicator and that was nice. And then in Los Angeles, there was a citywide mathematics fair or competition of some sort. I don't think it was overly organized. And big test you had to do when you were there. I was fortunate-- I remember I got second. I won a slide rule, which some of the people may not know what a slide rule is. It was a piece of equipment to allow you to do a lot of calculations more easily than by hand. But it was mechanical and way before the electronic things that can do it now.

DETLOF VON WINTERFELDT: And then from the senior year in Harbor City-Wilmington area, you went to UCLA. Did you look at other universities? How did you come up with UCLA?

RALPH KEENEY: I didn't. I think there was the SAT that they had everybody take at the school I was in, or many people. And I did reasonably well on that, particularly the math part.

So the guidance counselors came and found me, and they were enthused, because at least I did decently on that. And they said, where are you going to school, as if I should know and I should go to college. And so I thought, well, Montana State, probably. They said, Montana State? They knew nothing about Montana State.

College at UCLA and Grad School at MIT

Have you ever heard of UCLA? And I said, I know they play football, and had been to games, because they had free tickets for all types of athletic events that were given to newspapers then. Nothing sold out and I got to use a lot of them. So I knew what UCLA was. And they said, you should go to UCLA. So it's the only place I applied and that's where I ended up.

DETLOF VON WINTERFELDT: Wonderful.

RALPH KEENEY: It was a great place to go to school.

DETLOF VON WINTERFELDT: And what major at UCLA? How did you choose that?

RALPH KEENEY: Well, I thought about both math and engineering. First, I was admitted as math, but you can change it. And I looked at the requirements then after I did that, and engineering had sequences that were a solid four years-- the semester plan. And so a sequence of eight courses in a row was one part. So switching from math to engineering would have been much more difficult and you'd lose time, where math did not have such a restrictive curriculum and they didn't have as many courses. Engineering had more than others.

So I switched to engineering. And at that time, their degree was in simply engineering-- generalized engineering. Because the dean who started the school came during World War II, when the school started, and over half of the people in engineering with degrees apparently practiced in a field other than they were trained in. So he thought the basic ideas of engineering would be better to teach.

And so we got a lot of generalized engineering, and then I specialized a little in electrical, because there was a little bit more math there and I thought that would be potentially relevant for me to know.

DETLOF VON WINTERFELDT: Was that also the time when you became interested in operations research? Or did you hear the word operations research at that time?

RALPH KEENEY: It was. My sophomore year at UCLA during Christmas time, my cousin who was 12 years older who I knew reasonably well, but he had left Lewistown by the time I was six, so I never had any advice from him on anything to particularly do. But he had gone to the Korean War, came back and went to Montana State, and got a degree in math and then a master's. And he worked at Boeing then.

So he came down for Christmas and I asked him, what do you think I should focus on in engineering, given its generalized? And he said, well, at Boeing, people in operations research

are naming their salary and their hours. And I thought, gee, that's consistent with what I hope to get out of life. What is operations research? And he kind of outlined it a little bit for me.

And then I looked and UCLA Engineering actually had some courses in that that were typically evening courses for professionals and grad students, but any undergrad could take them and they didn't require things that I couldn't do. So I did take a few courses then and enjoyed them. I remember the first course, though. You walk in and here's all these guys who work for big companies. They were in their suits, they look like they know what they're doing. And you walk in and think, I have no idea.

And in fact, it worked out. They were in the course because they didn't know some things, too.

DETLOF VON WINTERFELDT: Absolutely.

RALPH KEENEY: Which was nice.

DETLOF VON WINTERFELDT: From UCLA you went to MIT after you graduated from UCLA. Tell me a little bit about your involvement with the faculty there. I think you worked at the OR Center as well.

RALPH KEENEY: I did. I might briefly mention how I got there. I thought a good time to interview companies and a lot of them would be at the last semester of my senior year. So I did that and I thought I'd probably just go somewhere and work. And one place I interviewed was Bell Telephone Laboratories.

I chose to interview them during the Easter break week and got a friend of mine to do the same thing, because I learned-- I went to the Bell Labs interview, it was the worst interview I ever had. He said-- first words, what's your grade point average? And I had a good one-- I think 3.7-something. And I said that, and he said, would you like to come back and visit Bell Labs for a couple of days? That was the interview.

So I said, sure. And you could add things on easily on trips like that for not much money. So it was spring break. Got the friend to go who I knew had good grades because I knew they'd offer him then. And we went to Fort Lauderdale-- the only kids from the west coast there for a couple of days, and then to Puerto Rico, then we went to the interview at Bell Labs. And that's where I accepted the job.

They had a very interesting program then, being they were essentially a government agency, even though AT&T wasn't. And they were the research group and a tremendous organization. They would take about 200 people and they supported them to get a master's anywhere, half of them full-time, half part-time around the area. And so I was offered where I'd like to go if I could get in. And so I applied to MIT. I found out they had a good OR Center. And fortunately, I was accepted.

DETLOF VON WINTERFELDT: So who were some of the people in the OR Center that you worked with and you were impressed by and enjoyed working with?

RALPH KEENEY: Well, over the three years I was in grad school-- then I thought I was only going for one year. But it was easy to meet people. The OR Center is the oldest in the country and founded by Philip Morse, who was the father of operations research in the US. A lot had started in Britain before then, and then also here slightly behind. And it worked on important problems during World War II. So he was the head of it and I was there, I guess, the 14th year after it started in 1966.

And then Al Drake was the associate director who was always around the OR Center, and I had heard about him from other people at Bell Labs. And so when I went there I thought he would be the person I'd like to work with. The idea was I'd just get a master's and go back to Bell Labs.

Then Gordon Kaufman, who was a statistical decision theorist, John Little, who everybody knows and has been president of this society and its earlier societies-- the Institute of Management Sciences and Operations Research were there. And they really did have, obviously, a wonderful group of people. And then the colleagues I had there were wonderful, too.

Howard Raiffa, PhD Advisor

DETLOF VON WINTERFELDT: And let's turn to Howard Raiffa. He's your mentor, your advisor, your co-author, and colleague. How did you meet him and how did that relationship evolve?

RALPH KEENEY: I met him in the first year of grad school. But the way it happened is, because Al Drake was around the OR Center all the time, he was one of the people I asked, what type of things are you interested in that one might write a master's thesis on? And he named three things and one of them was decision making, no more specific. And that sounded interesting to me and I said, what should I maybe read? And there wasn't too much at that time. It was 1966.

DETLOF VON WINTERFELDT: It was mid 60s, right?

RALPH KEENEY: 1966, the fall. So I did read a few things. And then I noticed that Howard Raiffa of Harvard was giving a seminar one evening at MIT. So I went to the seminar, enjoyed it a lot. And afterwards, I went down and asked him a couple of questions. And I was amazed he spent 10 minutes talking to me.

And he told me that he has a course at Harvard that was starting in the spring term in a month, and he'd like me to take it. So you could register in the other school-- MIT students at Harvard and vice versa anytime the course wasn't crowded with the school students. And so I did take that course and got to know him.

And so my master's was—kind of figured out the ideas there with Howard. But he said, working on problems with two objectives would be an interesting thing to do, which is what the master's thesis was on. And Al Drake was my official advisor for that, and Howard also-- I talked to him about thoughts and then wrote that master's at that time.

And then a fortunate thing happened. Bell Labs decided they would have a PhD program and they had support-- you were officially an employee. I had to turn in monthly sheets of what I did-- or weekly sheets. It allowed me three more years of funding to graduate. So I decided I'd stay there and get a PhD, because I liked school, thought it was enjoyable and not a hassle, and I enjoyed being in that area and everybody who came to that area from all over the world was exciting.

So I thought about a topic. And obviously you go from two objectives to more than two, and Howard was interested in that. So I asked him if he would be my advisor, which is kind of a big task, because he gets no credit for me-- he was at Harvard. And MIT had two rules to get a PhD. It's incredibly flexible on this. You need to be there one year and you needed to have a MIT professor as your advisor.

Yet I felt-- MIT always had the thing that if there was a good reason to break any rule, you need to go through the effort to put the case forward, but you could do it. And so I thought I would like Howard as my advisor. And I got him to agree partly because I said I won't be here every week for you to talk to me for an hour and tell me what to do. I do know you've got more important things to do, and I'll work and talk to you sometimes.

He's such a gracious man and smart anyway, you'd get as much out of him in 10 minutes as many people in much more time. So he agreed. And then I thought, now how do I convince some of the MIT people? And Phil Morse was on my doctoral committee. And I learned that Phil and Howard had never met each other, and yet they're both very famous in their separate places. And I said, well, one benefit, if you both agree to this, is you get to meet the other person.

And then Al Drake was the third person. And it worked out fine. Obviously at MIT, I think Al did most of the work of the processing of what you need to do to satisfy MIT, and then all three of them gave me advice.

DETLOF VON WINTERFELDT: So that period of time between '65, '66, '68 was this breakthrough area of Multiattribute Utility Theory as we know it now, right? You started with two objectives, you said, for your master's already?

RALPH KEENEY: Yeah.

DETLOF VON WINTERFELDT: And then an objective with multiplicative and additive utility functions and the whole package, right? The rest is history, so to speak.

RALPH KEENEY: Well, yeah, one big structure of multiple objectives was the dissertation. It had one thing that I believe a lot for OR, is it had theory, practice, and application; was after the colon in the title. And so it had some of each. And I should say that-- Peter Fishburn, who had laid down prior to that time the foundation for additive utility functions in--

DETLOF VON WINTERFELDT: It was '65.

RALPH KEENEY: Yeah, I think it was published in '65. And certainly talked to Peter after my dissertation, and we wrote a couple of papers together, too. So he certainly had a lot to do. And many others have contributed to the field, as you know, including yourself. And so that's, I think, when it really got things started.

First Academic Job

DETLOF VON WINTERFELDT: So you got your PhD. And what was your first academic job?

RALPH KEENEY: The first job was as an assistant professor in civil engineering at MIT. But it came about because I finished one year earlier than they needed-- they gave me three years, it took two. But Bell Labs had paid me and I was an employee, so I thought I would go back there. And Bell Labs hired a lot of operations researchers. And so I went back there and said, I'd like to re-interview for where I would be at Bell Labs, because I was in electrical switching systems and that wasn't who I was after OR.

And not being in this, I talked to the key guy there. And he said, if you come back to Bell Labs, you're going to be in engineering switching systems. And that's it. And I said, well, then I guess I won't be coming back. And it was that short of a time. So I was the first graduate in their doctoral program that was-- internally, some people wanted it and some didn't, and then I didn't come back, which was unfortunate. But I certainly was considering it.

So I interviewed three different universities and chose the MIT offer a lot because Howard was in the area, and by then we had decided to write the book Decisions with Multiple Objectives, which wasn't the title--

DETLOF VON WINTERFELDT: We'll come to that in a minute, yes. But after starting at MIT, you did some other things, and then you ended up for a while at the International Institute for Applied Systems Analysis. Did you actually take a leave for that or did you resign from MIT to go to IIASA?

RALPH KEENEY: I did resign. There is a step in between. I was at MIT three years in civil engineering. And when I was interviewing even for that job, I learned that Boston University had a program in Europe that was a master's program in Germany, in particular. And I thought I'd always like to go there and live there for a while. And I kept saying, whenever you have an opening that you need a foreigner, meaning a non-Boston University person, call me up.

And I kept contacting them every six months saying, still available, don't forget about me. And they called, and what would have been my fourth year at MIT, they had that. So I actually resigned from civil engineering to go one year to Europe, but kind of in conjunction with that, Sloan School, the business school, hired me at MIT. So I had leave my first year from Sloan. And I thought that would have been maybe a little better place for me anyway.

So I came back for one year at Sloan. And then during that time, the International Institute for Applied Systems Analysis had come into existence. And so Howard Raiffa was the director and had been negotiating there forever. It was just a great opportunity to go there, and I thought, not

very nice to ask for another leave of absence. And then I thought I really prefer living long-term in the Western part of the United States. So even though it's a tremendous place to be, I resigned.

IIASA and the Book *Decisions with Multiple Objectives*

DETLOF VON WINTERFELDT: You went by tour through Europe to go to the West. It's quite an unusual career. So let's go to the book. The book. This is now a classic called *Decisions with Multiple Objectives* that you wrote with Howard Raiffa. Tell us a little bit about how this all happened-- how you started it, where you wrote it, and how the interaction worked so it's one big package.

RALPH KEENEY: Well, I remember, I thought about, what would be a wonderful thing to do, given I was finishing up my dissertation. And at the very end of that second year, remained at MIT. And I thought, boy, to write a book on this with Howard would be terrific. He's the best in the world. It would obviously be wonderful for me, but it wasn't so obvious why it would be a great deal for him to work with some grad student or just finished.

So I thought about his objectives very carefully and tried to construct it so it would work out on the ones that he might be concerned about. And the main ones would be the dependence of his time on it and maybe the resulting quality of the book. And I said, we can meet anywhere at any time, things can be postponed anytime you want. Because he had a lot of important things to do. And if at any time you don't think it measures up to what you think is appropriate, it's just over.

And the other thing I said, I know you would like this book to exist and you're not going to get it done alone. And I said, I won't have anything more important to do. And so he didn't feel constrained, and in fact, that flexibility to not feel we had to push turned out to be crucial, because the negotiation, as you well know, for the International Institute for Applied Systems Analysis in Vienna went on for a while.

And for those who maybe don't know, it was a child of détente. After the Cuban Missile Crisis, the east and west leaders there-- and, in fact, Premier Kosygin from the Soviet Union and, prior to being, President Johnson of the US both realized that crisis was close. Is there anything we can cooperate on and kind of start something? And science-- it came out, and through a lot of negotiations, it was the Institute in Vienna.

So Howard was very busy during that time creating and then negotiating, and then he was the director for three years. So that's what IIASA was. So I was delighted to go there. And then whenever he did have a little time, we could make some progress on the book. And we did. And so in 1975, given we started in '69, we were done.

DETLOF VON WINTERFELDT: In '70--

RALPH KEENEY: '75. So from '69 to '75.

DETLOF VON WINTERFELDT: OK. Well, that's consistent with my memory, because I know that you gave me a pre-copy to read and I knew that it was a fantastic book even then. Did you

know that-- were you surprised a little bit by the impact it made or that it now is an absolute classic in the field?

RALPH KEENEY: In some sense, yes. I think, though, we didn't ever discuss, Howard or I, and I didn't particularly think about what will happen to it. Certainly had the aspirations it would make a positive contribution to the field. I remember when I used to think of problems the first year, I thought, what's a multiple objective problem I could think of? And everything seemed single objective. Like, there's a waiting line. Well, you want it to be shorter.

And then once you get into it, you can't think of a problem that doesn't have multiple objectives. You've got a waiting line, well, you'd like it to be less time to wait, but you'd like it to be very equitable for who waits, because the less time's on the average and those types of things. And you'd like the people in the line not to be upset. And those are different. They're correlated perhaps in how well they're met.

So we were-- well, I think we were both surprised that it still sells today. It's 50 years after that time.

Woodward-Clyde Consultants

DETLOF VON WINTERFELDT: Yeah. Well, certainly it deserves it. Then you made another move, which surprised some of us who were friends and observed you, that after IIASA, you joined a consulting firm, Woodward-Clyde Consultants, which generally, if you're academically minded, could be a dead end. It's hard to get back from consulting to academia. So why did you do that and how were you able during your Woodward-Clyde Consulting days to keep such a high academic profile? I think that would be a good lesson for our listeners, especially the younger ones.

RALPH KEENEY: Well, the way I heard about Woodward-Clyde-- Al Drake and I taught a summer program on decision analysis that included multiple objectives. In the beginning, it was a two-week program and it went till about 1982-- something, a lot of years. So I came back from IIASA to teach that, because it's only two weeks. And one of the guys I met there was an executive-- he was vice president of Woodward-Clyde Consultants, an engineering and geotechnical consulting firm.

So he offered me a job out of the blue. I was going to come back and enjoy myself for a while, and then look for a job. And it seemed appealing and I took it. And I was head of what they called the decision and risk group, to construct it there. About 700 people working, and they worked on where to site power plants and risks of LNG facilities and had the best earthquake group in the world. And they worked on real problems and I'm interested in that, and had done some similar consulting, one with Howard on Mexico City Airport, the development and partial siting-- considering different sites there at that time.

So being one who believes in applications, I thought it'd be nice to go and see how some of these multiple objective utility functions might work and contribute.

So that was my motivation. And then we did get very good people there. And the other thing is publish the papers. And a thing that everyone might find interesting is I asked John Little, given I go there, what would be a good thing to do to keep the flexibility to go back to academia if I wished? He said, write one high quality paper per year.

DETLOF VON WINTERFELDT: Well, good advice.

RALPH KEENEY: The thing I did is, obviously if you're a consultant in those days, you would turn in a report to the client. I would write the report so that-- because you have a lot of flexibility on exactly how it is written such that would almost fit very easily between two separate parts of a published academic paper. The first part, given this general problem with these features, then what, and then a literature review, and then here's an example. That was the whole report that you could more or less plug in. And then you'd have a conclusion section of what's learned here.

And certainly in those days, the operations research profession was very happy to have such things published. And also then from the consulting, you learn much more clearly what are some of the technical challenges that would be worthwhile working on that if you can get a analytical solution to some model, it will provide insight and help on other real world problems. So you improve the relevance of the theoretical work, too.

DETLOF VON WINTERFELDT: I remember those days and I remember that most of the early applications were kind of like tests or experiments, if you will, if this theory really would work in the real world. Did you go in there and start to apply and you knew that it would work? Or were you also a little bit, well, maybe it works, maybe it doesn't work?

RALPH KEENEY: I think it was more that I thought it would work. But there was a lot of flexibility on what work meant.

DETLOF VON WINTERFELDT: Yeah.

RALPH KEENEY: Work isn't to-- or I didn't think of it as it gives them the answer and you hand it over and they say, this is wonderful, my problem's over. Work is really the insight they get to understand their problem much better. And I was quite sure you could help them on that.

One of the things that amazed me when I was a student, I thought you could go to anybody who had a important decision problem and say, could you just tell me your objectives and tell me your alternatives and then we can do a great analysis? And people can't tell you their objectives or a full range of alternatives, often missing very good ones in a vast majority of the cases where there's real substance to the problem.

And I remember one time talking to the head of a large utility company about the objectives for siting a facility for a few billion dollars in those days, and talks on about the objectives. And I said, any other objectives, et cetera, et cetera? And after a while I said, do you have any environmental concerns? Oh, yeah, we've got tons of environmental concerns, and it never came up. And Ben Franklin said the same thing 200 and some years ago, is many of these problems are

so difficult because at a given time, you are thinking of some of the objectives-- he used a different term-- some of the things that really matter, and the others are out of sight.

And then at another time, they might even change around a little. And so the insight from kind of having it organized and helping them articulate their objectives and then alternatives that can achieve those certainly made contributions. So I wasn't worried about making a contribution.

DETLOF VON WINTERFELDT: I see.

RALPH KEENEY: And the insights you can usually get to.

Applying Decisions to A Personal Life

DETLOF VON WINTERFELDT: So let me completely switch topics for a moment and turn personal. When and how did you meet your wife? Tell us about it.

RALPH KEENEY: Well, that was making a decision. And you have choices. In those days, you could take flights. And if you were going from point A to B, and particularly I was going to Houston for a Monday morning meeting on an LNG facility that was proposed for Texas, and leaving San Francisco, where I lived at that time where Woodward-Clyde was, I left on Friday and went to Aspen to ski for two days. And while in Aspen, that's where I met my wife, Janet. And--

DETLOF VON WINTERFELDT: The rest is history.

RALPH KEENEY: Yeah, it really is. One thing that happened, though, after we got to know each other-- well, she lived in New York and worked in an advertising agency. And I thought, well, decision making and marketing and advertising certainly overlap. We should be able to give a talk at an INFORMS-- actually, an Operations Research Society meeting then, which we did in New Orleans. And that way we both could go to New Orleans and have a nice time together.

And the talk was on decisions about children's advertising on television. It was a big, big issue. You'd have, politically, some people would say, it's horrendous-- these little kids get up in the morning, they watch the cartoons and they see all the sugar cereals advertised. And they eat it and it's terrible for their teeth and they demand it. And that is one side of the problem. But then you really look at it in a multiple dimensional sense and we outlined the objectives that we thought were at least some that's relevant.

There are probably 10 million kids who don't have a parent who gets up little kids to give them any food on Saturday morning or these other mornings. And one of the few things a three-year-old or a four-year-old might be able to get for themselves is cereal. So the trade-off is a little bit, do you have any breakfast or do you avoid the sugar?

DETLOF VON WINTERFELDT: And you gave the presentation together?

RALPH KEENEY: We did.

DETLOF VON WINTERFELDT: Tandem or--

RALPH KEENEY: Well, tandem, in a sense. The problem was much more in the marketing and advertising area. That's where everybody was complaining about these ads and things, and the outline of the whole problem was there. And then my part was, that's the problem, here's a way to structure it and to understand much better what the implications of various alternatives are and perhaps create some that might be better than any of the ones that have been thought of.

From Consulting to USC

DETLOF VON WINTERFELDT: So in 1984, which I believe was the year of the Olympics in Los Angeles--

RALPH KEENEY: It was.

DETLOF VON WINTERFELDT: You moved to LA from San Francisco to join USC. Tell me a little bit about your USC time.

RALPH KEENEY: Well, a thing that stimulated the movement is our firm moved its offices from downtown San Francisco 25 miles out to Walnut Creek, which is a nice place. But I lived in downtown San Francisco and walked to work. And a lot of people were disrupted by that, as you would in such a move. And so I was interested in doing something else.

I learned of a program at USC that was one, of interest-- in fact, it's the one you were in. They had a program where they had a master's degree in systems management, another one in system science-- closely related-- that was given all over the world to people in the US military, although people not in the military could take those courses, too. And the teaching responsibility was, if you got research funds to cover half your time, two courses per year, which could be done in a two-month period.

So because I stayed living in San Francisco because that's where Janet worked, then the head of marketing at Levi's and then at Sprint, that's where I wanted to stay. And so this was a way I could have a good affiliation and work with wonderful colleagues, you and some others. And so it just seemed like a great place to go spend some time. And we did get to work on a lot of interesting problems together there.

DETLOF VON WINTERFELDT: And you could stay in San Francisco, which met both of your objectives.

RALPH KEENEY: Yes.

DETLOF VON WINTERFELDT: This was one of the few cases that I've ever seen a consultant or somebody from a consulting company return to academia. So there is a way back, obviously. Moving forward quite a bit, in the late '90s, you wrote a popular book, *Smart Choices* with John

Hammond and Howard Raiffa. What made you do that? Was it ripe for translating Multiattribute Utility Theory into something that could be done and understood by regular folks?

RALPH KEENEY: I think a few things. Howard had for years wanted to have a popular book on that idea and thought, as many of us in our profession and operations research, management science think, there's value to doing what we do and it's often hard having other people understand what it is we do. And so he was always interested in doing that.

And John Hammond had worked with Howard prior to me and I knew him pretty well, wonderful guy to work with. And so Howard kind of put it together and asked if we'd be happy to do that. And we thought it would be interesting and that's how it came about. So we worked on that for about a year and a half. Obviously, the communication is a lot different in a book for the general audience than it would be for a larger one.

DETLOF VON WINTERFELDT: So you published it at Harvard University Press or--

RALPH KEENEY: Harvard Business School Press. So that was in about 1998. We were fortunate, perhaps, but it sold well. Their standard was for a well-selling book 50,000 copies, and sold that in a couple years. And perhaps partly-- a couple articles on that book were in the Harvard Business Review, one of which has been reprinted in about six of the books that say Harvard Business Review's must reads and things like that, which is nice.

DETLOF VON WINTERFELDT: This was on Pitfalls, right?

RALPH KEENEY: Yeah.

DETLOF VON WINTERFELDT: Pitfalls of Decision--

RALPH KEENEY: "Decision Traps" was the name of that title. And then there's one on even swaps that's been reprinted a few times. But we were a little surprised-- it's now published in 20 languages and a lot of different--

DETLOF VON WINTERFELDT: What's the most exotic language that it was published in? Kazakh or--

RALPH KEENEY: Well, it's certainly in Arabic. And it's in Slovenian, which is one of the smaller places. It's in all the languages that you'd think would have a large audience, except French. It's even-- it's in Russian. There's three Chinese versions. There's the Hong Kong, the Taiwan, and mainland versions.

More Decisions in a Personal Life

DETLOF VON WINTERFELDT: So let me ask you a personal question again. Do you use decision analysis or Multiattribute Utility Theory in your personal decisions-- in your personal life?

RALPH KEENEY: I think the answer is absolutely. And I think what appealed to me-- this was the natural way that I thought. When I was very young, I knew what I would like in life-- I wanted to be free. And that's why Lewistown was a great place to be, and I experienced what being free was. And so then I wanted to articulate that a little more clearly once Janis Joplin had her song: “Freedom's just another word for nothing left to lose.”

And so I thought about it, and being free is a means. If you're free and you don't use it, it's not worth anything. So I did think about what I wanted in life and laid out my objectives. And that's published in *Value-Focused Thinking*, a book that's with Harvard University Press. But that always guides me on my important decisions. And if you really have your strategic objectives of life answering, why are you bothering to live, in a sense, you don't have to be tethered to those, but it's always that I'm trying to go in this direction.

And so if you don't know what to think about and you've got a really messy problem and everything, what relates to what I care about? And I do think about those. The other thing where I really use it is with the concept of creating my own decision problems. But I don't call them problems. A lot of people problems, they're called decision problems because something occurs and you think, oh, no, and you've got a decision problem to kind of make it better. If you get sick, you got a problem. You lose your job, a problem. And you try to make decisions to get you back to the level of quality of life or where you were before.

And these are caused externally. You don't cause problems for yourself. Who wants problems? But the only way to purposefully influence anything in life is through your decisions. You can have a big influence by acting without thinking. But given that, I would like some really nice problems. And I call those that I create for myself decision opportunities, and I formally do this a lot.

You're not trying to get back to where you were before a problem occurred, you're trying to make life better relative to how it was. It doesn't have to be selfish. It could be making it better for your university if you work there, better for your professional society by things you decide to do for it, hopefully make a contribution to better society-- the whole thing. And in fact, that's going back to how I talked to Howard writing our book. I thought of this book, *Decisions with Multiple Objectives*.

So I know the alternative. I'd like to write a book with him. How can I create the alternative of doing it such that it's positive for him? It was the same, how do I have a job at USC, given I'm in San Francisco? You figure out, what can I contribute to make me really worth it at USC, and yet be able to have the one feature that's an odd one-- live in San Francisco? Now, they're close enough you could commute there. And a big aspect of that is, as my best friend, you really know what's going on, you're not isolated, you don't walk away and not know.

So in a sense, on all the big decisions. I'm always explicitly thinking. Most of the time I don't do quantitative analysis or anything, but I do some things once in a while to get some numbers that might indicate how various alternatives might measure up on a couple of the objectives that I'm concerned about and I can even think qualitatively about quantitative things about the other

aspects of the problems. So I definitely use it and I advocate it, because again, decisions are the only purposeful way to influence anything in life.

Duke University

DETLOF VON WINTERFELDT: So maybe you can play this out also for your next decision. This was the decision to resign from USC and to take a position at Duke University. How did that play out? Why did you leave USC? Why was Duke attractive?

RALPH KEENEY: Well, they were a bit separate decisions, but I certainly use the same ideas. The program we were in that had courses all over the world-- so you'd go to places and teach for two months-- was terminated. And so you were kind of shuffled into different departments. And that just wasn't quite as good and was enough to stimulate thinking about what I'd like to do, which every once in a while-- I think every five years you ought to think, OK, I've got the rest of my life left, what's some good things to think about?

And I thought it would be interesting to be somewhere else, have very good colleagues in the decision sciences. Not that I didn't there, but that would be a requirement of the place I would like to go. And I thought of various alternatives, and then looked at how could I contribute to those places. And then thought might work at Duke and--

DETLOF VON WINTERFELDT: A little bit longer commute, though, right?

RALPH KEENEY: Longer commute, but the way it was set up-- I still lived in San Francisco. I was not interested in tenure and I didn't want to teach in the regular MBA program, because it was a business school. And our son was then in high school and wanted him to fit in well in San Francisco and I wanted to be around a bunch. So I would go a week a month. But when I was at Duke, I was really at Duke. Like, nine, 10 hours a day and do tons of things, and communicate the rest of the time and worked with many, many people there.

You do all the setup during the one week, and then you go away and you do what you said you'd do and they do what they say they would do, and you come back. And the other thing, of course, I said, anything that was special on timing at Duke, I'll be there if there's any way I can contribute. I can adjust the weeks and whatever.

So my job was to contribute to the 99 objectives that the business school has other than teaching the MBA program. And the simple thing is, I thought if I could do a little more on that and not do something here, the portfolio of one oddball is worth it. And certainly my colleagues in the administration there were really terrific about it. It was a five-year appointment, and after the five year appointment, I was reviewed, I think, for another five years.

One person said to me, I want to thank you for making that the easiest reappointment decision we ever had. It's also much simpler, because it's not forever and things. It worked out very well.

DETLOF VON WINTERFELDT: So let's turn to the present. You are now emeritus professor at two universities, Duke and USC, which is probably pretty unusual, but great. And you are not inactive. You're writing a new book. Tell us about that.

RALPH KEENEY: That's a book on what I'd say is the neglected front end of decision making that I alluded to earlier. Many times people rush in and they've got a decision problem, and there's a big push, I want to solve this and get it over with or procrastinate and not deal with it. And before the solving anything, it's really important to understand the decision.

In the front end is, what's a statement of the problem I'm dealing with? And often a poor statement is, for instance, shall I do this or not? And the problem is "not" is everything else in the world just about. Because if it's a three-week thing, shall I do it or not, it would depend on what you would do with that three weeks if you don't.

So anyway, just stating it, but then you really do the work. What are the objectives you hope to achieve by doing it? And then use the objectives partly to stimulate good alternatives, because anything that can contribute to one of the objectives is a part of a good alternative. And then with that set of objectives and alternatives, you've got a great frame of your decision that indicates every piece of information it would like.

That's when you want to gather information, once you understand your decision. You don't want to go quote-- as I've heard sometimes—"First thing I'll do on this big decision is gather all the information." Millions of dollars might be spent, and a lot of it's not useful and it takes a lot of time. And that's because it's not overly relevant to the choice.

So that's what the book is about, the front end. And it's for anybody who makes decisions. But it includes businesses and organizations. Because the mind is the decision making aspect. And one can say business decisions and personal are different, but the thought process occurs in a mind, so it's got to be the same. What are the objectives? What are the alternatives? People have them in the same places.

And then certainly for some organizational business decisions, you'd like real analysis afterwards-- decision analysis and things. And you can't get practice on problems without really having a fundamental understanding of what's relevant to the problem. So people in one aspect of a business wouldn't have any idea what the objectives might be in another one. If you're pumping out the oil in a company and you've got big decisions-- multi-billion dollar decisions, you wouldn't know what the objectives would be in some big refinery decision. Just totally different.

And so it's hard to have problems where everybody, let's say in a class, can create objectives. Say, here's a decision, figure out the objectives. So what we do-- we say, given a decision of the following type with these objectives and these alternatives, then-- that's kind of the first of how we teach much of this and you've thrown away a lot of this stuff that's crucial, that front end. So that's what this book is about.

DETLOF VON WINTERFELDT: Good. So you obviously had great success in academia, great applications, made a difference to organizations, decision makers, and so on. Did any of your work get caught by the public media or have an influence on the general public in any way?

RALPH KEENEY: I don't know an influence, but some of them got picked up that I was interested in. One idea-- people don't like to make trade-offs of statistical loss of life versus money. And as you know, we have government programs where some spend $10 billion to avoid one person losing their life. And there's other places that government agencies spend $200,000 and we can save a life.

And there's now-- it's much better than it used to be-- a lot of work, and you can certainly save a life on the highway by investing $5 million dollars, $6 million sensibly to make the highway better in a certain location. And there's data that will support these types of things. So there are now even some recommendations by some agencies, like the Department of Transportation where I think they use 8, 9 million dollars as a value of statistical life.

So one of the other things that would support the idea for the people who say you can't put a dollar value on life is when you get that money from the government, it's basically our money-- it's everybody in the country's money. And you take money away from people, you make them poorer. And Aaron Wildavsky had done work that richer is safer, and I was able to quantify that because more data was available. And for how much money that we take out in taxes, so to speak, and transfer over here to save a life, how many people died?

And it amazed me at the time. In today's money, 5 or 6 million dollars, somebody would die-- you don't know who they are. So that was published and that was in, I think, *BusinessWeek* at the time and was a little bit of a different idea.

And another one is I had looked at why people die in the US much later. And 2 million deaths-- little over 2 million per year in the US, over half of them could have been avoided if the individual who died would have chosen readily available alternatives to them.

So the biggest cause of death was overwhelmingly personal decisions. And the big ones, which I knew you'd get the data-- it was kind of trivial-- being way overweight or smoking lead to almost all diseases. So that would have a big impact, but those occur later. I was amazed. Even the age group from 15 to 24 by 10 year groups, every group it was 55 to 60 percent could be avoided from age 15 to 64.

DETLOF VON WINTERFELDT: Like, not drinking when you're driving or--

RALPH KEENEY: Yeah, for the younger ones, that was it and drugs and things. And not saying it's trivial, but there are decisions there. And that certainly surprised a bunch of people and surprised me at that lower end. And that was in *Wired* and some places pick up those ideas. But in each of those cases, I partly wrote the article hoping that's where the impact would be. Not that these are answers, but have people at least think about it.

Retrospective

DETLOF VON WINTERFELDT: Last question. So what do you think in summary of your academic and applied life has been your major accomplishments? And how would you like the OR community to remember you?

RALPH KEENEY: I think the major substantial contribution was probably, earlier, the Multiple Attribute Utility Theory, as you said, and the more quantitative. And then much later is that the general structuring and understanding the decisions we face and how crucial that is to really guiding our life. And I would like to be remembered as one who made some of those contributions, and I'd like that they think both to the theory part of the question, but also the practice, meaning how you implement it-- can implement it and implement it well.

And then third, how you can apply it so that you do have some influence. I'd like our profession to do that. Partly why that's my answer is my strategic objectives of my life, which I've laid out, one is to really enjoy the thinking part of life. And that's thinking, learning, understanding, wisdom-- using it. And then the enjoyment part of life, and that's fun, excitement, et cetera. And that's what I get out of life. And what I'd like to contribute is to the quality of life of family and friends. Those are two separate branches of that.

And then make a quality of life more generally to others, including my country, which existed because of a lot of people's work before me, to have, in a sense, an incredibly large set of opportunities and a fairly decent life that you could follow and probably have that come out. And if you put some effort in and if you decide what you want to do, very likely you can do a lot of those things is what seems to be the case.

DETLOF VON WINTERFELDT: All right. Well, on that note, thank you very much, Ralph Keeney. And we'll see you soon.